

## REMARKS

As a preliminary matter, Applicants appreciate the Examiner's clarification that the March 21, 2006 Office Action is a non-final Office Action. *See* May 2, 2006 Office Communication.

Claims 1-4, 8, 9, 10 and 13 stand rejected under 35 U.S.C. §102 (b) as being anticipated by United States Patent Application Publication No. 2002/0075429 to Fujioka et al. Applicants respectfully traverse this rejection.

Applicants respectfully submit that the Fujioka et al. reference fails to disclose a substrate for a liquid crystal display that includes, *inter alia*, a cell gap control layer that "reduces the cell gap in the display area to be greater than 1  $\mu$ m and less than 2  $\mu$ m," as now defined in amended independent Claim 1. Similarly, the Fujioka et al. reference also fails to disclose a liquid crystal display, as defined in amended independent Claim 3, which includes the same feature.

One example of an embodiment of the present invention that includes the cell gap control layer defined in independent Claims 1 and 3 is shown in Applicants' Figures 3 and 4. In these figures, the cell gap control layer 42 is shown as being inside the sealing material forming region (near sealing material 40), without being formed under the sealing material. Figure 4 also shows how the cell gap control layer 42 reduces the cell gap between the base substrate 10 and the opposite substrate 11 to thickness "d1," such that the cell gap in a display area where the cell gap control layer 42 is formed (thickness d1) is less than a gap in an area outside of the cell gap control layer 42 (thickness d2). Such a configuration

advantageously provides a desirably smaller cell gap (d1) in the display area, without the need for reducing the amount of sealing material ejected from the dispenser because a gap (d2) in the sealing material forming region can remain relatively large. Allowing the larger amount of sealing material is desirable because it is difficult to control the amount of sealing material ejected from a dispenser when only a small amount is to be dispensed, which could otherwise result in dispensing the improper amount of sealing material that could cause leakage of the liquid crystal.

As disclosed on pages 8-9 of the instant Specification, the thickness of the sealing material 40 (distance “d2”) is preferably between the range of 3.5  $\mu\text{m}$  to 5  $\mu\text{m}$  (and more preferably 4  $\mu\text{m}$ ), and the cell gap control layer 42 preferably has a thickness of between 1  $\mu\text{m}$  and 3  $\mu\text{m}$ . Thus, subtracting some of the values of the range of thicknesses of the cell gap control layer from the thickness d2, the resulting cell gap (d1) can be determined to be a value greater than 1  $\mu\text{m}$  but less than 2  $\mu\text{m}$ , as defined in amended independent Claims 1 and 3. Further, as also disclosed on page 9, lines 13-15, the cell gap d1 is 1.4  $\mu\text{m}$  in the preferred embodiment, as defined in new dependent Claims 16 and 17.

In contrast, in the Fujioka et al. reference, the cell gap thickness is much larger than the claimed range of greater than 1  $\mu\text{m}$  but less than 2  $\mu\text{m}$ , as defined in independent Claims 1 and 3. For example, on page 7 (paragraph 0097, lines 9-11), the diameter of the spacer 116 (Figure 9) is disclosed as being 4.5  $\mu\text{m}$ , which would also make the cell gap 4.5  $\mu\text{m}$ . A cell gap of 4.5  $\mu\text{m}$  is more than four times that of the lowest value of the claimed range, and is more than double that of the highest value of the claimed range.

Further, the chart of Figure 10B of the Fujioka et al. reference shows that for values of  $d_{se}$  (Figure 9) of less than  $5\mu\text{m}$  (where  $d_{se}$  is slightly larger than the cell gap because  $d_{se}$  includes thin electrodes 202, 209 and thin orientation films 112), there is separation of the resin component of the sealing material. Thus, the Fujioka et al. reference teaches away from cell gaps of less than about  $5\mu\text{m}$  (minus the thicknesses of layers 202, 209 and 112). Additionally, the chart of Figure 11 of the Fujioka et al. reference shows that the appropriate diameter of the spacers 116 (which diameter is equal to the cell gap) is between  $4.5\mu\text{m}$  and  $6\mu\text{m}$ , depending upon the amount of overlap between the frame region and the sealing material. Thus, the Fujioka et al. reference teaches away from cell gaps less than  $4.5\mu\text{m}$  and greater than  $6\mu\text{m}$ . Accordingly, Applicants respectfully submit that the relatively small cell gap of greater than  $1\mu\text{m}$  and less than  $2\mu\text{m}$  defined in amended independent Claims 1 and 3 is not disclosed or suggested in the Fujioka et al. reference. Accordingly, for at least this reason, Applicants respectfully request the withdrawal of this §102(b) rejection of independent Claims 1 and 3 and associated dependent Claims 2, 4, 8, 9, 10 and 13.

Claim 5 stands rejected under 35 U.S.C. § 103 as being unpatentable over Fujioka et al. in view of United States Patent No. 5,748,266 to Kodate. Claims 6 and 7 stand rejected under 35 U.S.C. § 103 as being unpatentable over Fujioka et al. Claims 11, 12, 14 and 15 stand rejected under 35 U.S.C. § 103 as being unpatentable over Fujioka et al. in view of United States Patent No. 6,100,954 to Kim et al. Applicants respectfully traverse these rejections.

Claims 5-7, 11, 12, 14 and 15 all depend, directly or indirectly, from either independent Claim 1 or from independent Claim 3, and therefore include all of the features of either Claim 1 or Claim 3, plus additional features. Accordingly, Applicants respectfully request that these §103 rejections of dependent Claims 5-7, 11, 12, 14 and 15 be withdrawn considering the above remarks directed to independent Claims 1 and 3, and also because none of the secondary references remedy the deficiencies noted above, nor were they relied upon as such.

Applicants have added new dependent Claims 16 and 17, which more specifically define the cell gap as having a thickness of approximately 1.4 $\mu$ m. For the same reasons set forth, Applicants respectfully submit that the cited references fail to disclose or suggest such a relatively thin cell gap. Accordingly, allowance of new Claims 16 and 17 is also respectfully requested.

Finally, Applicants have also added new Claims 18-32 (including new independent claims 18 and 23). New independent Claim 18 defines a substrate for a liquid crystal that includes “a protection film formed throughout the base substrate; and a cell gap control layer, formed in the display area on the protection film, that reduces a cell gap between the base substrate and an opposite substrate provided opposite to the base substrate, such that the cell gap in the display area where said cell gap control layer is formed in less than a gap in an area outside of said cell gap control layer” (emphasis added). An example of an embodiment including such feature is disclosed on page 7, line 28 – page 8, line 2 and in Fig. 4. New independent Claim 23 defines a liquid crystal display that includes a “protection

film formed throughout the base substrate; and a cell gap control layer, formed in the display area in one of the base substrate and the opposite substrate, that reduces a cell gap between the base substrate and the opposite substrate, such that the cell gap in the display area where said cell gap control layer is formed is less than a gap in an area outside of said cell gap control layer” (emphasis added). An example of an embodiment including such feature is disclosed on page 7, line 28 – page 8, line 2 and Fig. 4, and page 8, lines 19-21.

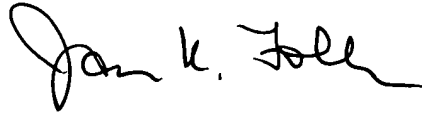
In the present invention of Claims 18 and 23, since the protection film is formed throughout the base substrate, the protection film is formed in the sealing material forming region and the display area. In contrast, the Fujioka et al. reference and the Kodate reference fail to disclose the protection film formed in the sealing material forming region and the display area and the cell gap control layer formed in the display area. Additionally, the Kim et al. reference also fails to disclose that second inorganic film 179 is formed in the sealing material forming region and the display area. The Kim et al. reference fails to disclose that a protection film 159 is not formed in the sealing material forming region. In addition, the Kim et al. reference also fails to disclose that the protection film 159 reduces the cell gap. Therefore, the Kim et al. reference fails to disclose the cell gap control layer having the above-mentioned features of the invention. Accordingly, since all of the features of new independent Claims 18 and 23 are not disclosed in the cited references, Applicants respectfully submit that new independent Claims 18 and 23, and associated dependent Claims 19-22 and 24-32, should also be allowed.

For all of the above reasons, Applicants request reconsideration and allowance of the claimed invention. The Examiner is invited to contact the undersigned attorney if an interview would expedite prosecution.

Respectfully submitted,

GREER, BURNS & CRAIN, LTD.

By



James K. Folker

Registration No. 37,538

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Suite 2500  
300 South Wacker Drive  
Chicago, Illinois 60606  
(312) 360-0080

Customer No. 24978  
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